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(54) **Clutch blocking device for adjusting and blocking doors or windows in a desired position.**

(57) The device establishes a clutch connection between the sash (3;102) of a door or window and the respective frame (2;101).

The device is an adjustable clutch hinge (1) with one part (5) fixed to the frame (2) and one mobile part (4) rotating about a pin (7) in a slot (8) around a clutch (9,6,6') which comprises the hinge between the two parts (4,5).

Or, it is a pinzer element (E,E',E") with its upper (104,104') and lower (103,103') elements fixed to a sash (102) and holding tight between them a sliding semicircular sector (110,111,111') fixed to the frame (101), where the force of the friction is adjustable by means of the screw (107) and spring (106).

The sash may be blocked in any desired position, along the entire opening amplitude, silently and with no specific manual intervention on the device (Figures 1 and 5).

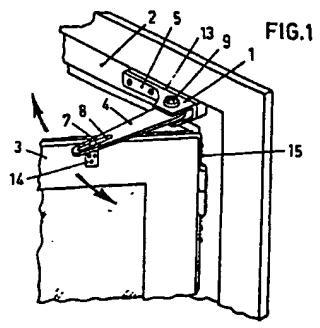


FIG.1

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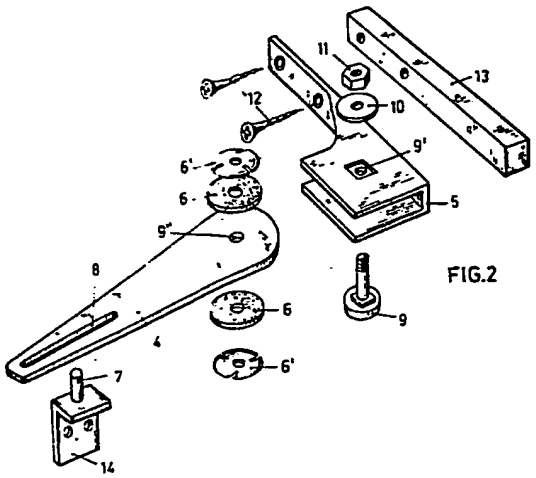


FIG.2

FIG.3

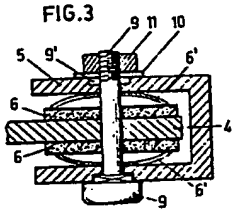


FIG.4

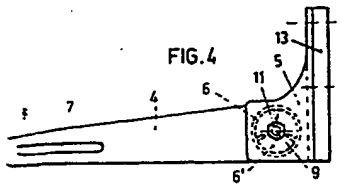
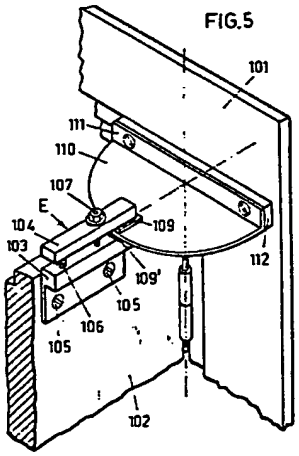


FIG.5



Clutch blocking device for adjusting and blocking doors or windows in a desired position

The invention concerns a clutch blocking device for adjusting and blocking doors or windows in a desired position, with no manual intervention on the blocking device.

Door and window blocking devices are known, in very many shapes and types of application. All aim to allow the sashes to be opened as desired and blocked in a certain position, so that drafts, or other accidental causes, cannot cause undesired movements of the sashes, such as door and window slamming.

However, these devices suffer from the inconvenience of requiring manual placement from time to time for a given open position of the sashes. This means that once the open angle is established, the defice effects the block by means of grooves, pins, screws, sliding clamps or analogous devices; therefore, varying the angle always requires manual handling of the device.

For example, the devices known from the German trademark applications 1,899,327, 1,927,526, 75 15 214, 72 17 157 and 27 52 962 and from German patent applications 25 04 271 and 29 40 812 all aim to adjust the

opening of doors and windows, but all require manual intervention whenever the position of the sashes is to be changed.

To overcome this problem of requiring manual intervention for each position of the sashes, the invention aims to realize a device as described in the above-cited literature, but which allows the sash of a door or window to be opened and closed without requiring manual intervention to fix it in the desired position by means of blocks of various types, such as grooves, pins, screws, sliding clamps or the like, and which allows the door or window sash to be moved with no noise.

The invention achieves this goal by realizing a clutch connection between the door or window sash and the respective frame, where the connection is simultaneous with the movement of the sash the blocking effect is direct, with no manual intervention, and where the friction force of said clutch is adjustable using elastic means.

In a first embodiment of the invention, said connection is realized by means of a hinge consisting essentially of two elements connected by a hinge, the first of which is fixed to the frame of a door, or a window, while the second is rotated by a pin fixed by means of a rod onto a sash and sliding inside a slot of said second element, where said first and second elements are con-

nected to one another by means of a pivot realized like a clutch by placing between said fixed first element and said second mobile element, on both sides of the latter, material which can generate friction and, at the same time, which has sufficient resistance to wear by rubbing, where said pivot releases part of its friction force to elastic elements placed in turn on both sides of said second mobile element, between said material and said first fixed element.

The fundamental concept of this first embodiment of the invention thus lies in the elastic clutch pivot of the hinge, which allows a door, or window, sash to be placed and blocked almost silently in any desired position, from 0^{o} to 180^{o}.

According to the invention, the material to be placed between said first fixed element and said second mobile element, which must satisfy the double requirement of generating a good friction effect and of showing good resistance to wear from rubbing, is preferably asbestos. The invention also provides that said elastic elements consist of springs, preferably bucket springs, convex toward the outside of said first fixed element.

According to the invention, the length of the slot in said second mobile element must be at least equal to the distance between the axis common to the hinges which hold the sash in rotation and the axis of the

pivot, with the hinge positioned.

The invention also provides that the pin head screw of the pivot has, under the head, a square molding which fits into an identical molding on both the vains of said first fixed element. This block always arises naturally between the square molding of the pin head screw and the identical molding of one of the two vains, depending on whether the hinge is used for the left or right sash of a door or window. Indeed, the threaded part of the pin head screw protruding beyond the vain opposite that in which the screw has been inserted must always be pointed upwards, so that it does not interfere with the movement of the sash.

Finally, according to the invention, the material suitable for the hinge according to the invention may be selected from lightweight alloys, preferably aluminum, as well as from other materials, such as synthetic resins satisfying the requirements of the hinge.

According to a second embodiment of the invention, said clutch connection between the door or window sash and the respective frame is realized with a device consisting of a pinzer element equipped with wear resistant means, fixed on a door or window sash, which operates via friction along the entire 180^{o} opening of said sash, directly on means joined to the door frame, where these also extend along a 180^{o} arc, that is, along the section

covered by the rotating sash.

The fundamental concept of this second embodiment of the invention is thus based on the force of friction, developed by an element joined to a sash, directly on means joined to the frame of a door or window, and thus with no interposition of intermediate articulations.

According to the invention, said pinzer element is realized in three variants:

- the first provides the pinzer's braking action by means of a helical expansion spring and an adjustment screw;
- the second provides the braking action by means of the screw only;
- the third provides the braking action by means of the spring only.

The invention provides that said means resistant to wear from friction consist of asbestos plates protruding slightly from the edges of the two ends of the pinzer, while the two arms of the pinzer are made of metal, preferably aluminum. If the arms of the pinzer are made of suitably hard synthetic resin, the friction ends are made of soft synthetic resin.

The means joined to the door or window frame are represented by a semicircular sector, always and only made of metal, preferably well polished tempered elastic

steel, with an angle bend at the base to allow application to the frame, eventually with the aid of a spacer.

The angle bend is on one side or the opposite side of the circular sector, depending on whether it is applied to the right or left side of the frame. Said sector will have a 180° arc if the sash may be opened that wide, or a 90° arc if the opening cannot exceed that value. These 90° sectors are also folded at an angle at the base, in one direction or the opposite one, depending on whether they are to be applied to the right or left side of the door.

The mid-point of the 180° arc sectors or, respectively, the point corresponding to a right angle of the 90° sectors, must always be aligned with the axis passing through the hinges which constrain rotation of the sash.

The advantages obtained with both embodiments of the present invention reside in the clutch connection of a door or window sash with the respective frame. Opening or closing the sash, the clutch hinge or the pinzer element automatically block the sash in any desired position along the entire opening arc in an absolutely silent fashion and with no specific manual intervention on the device.

The invention is described below in detail with refer-

ence to embodiments shown in the attached drawings in an exemplificative and non-limiting way. The figures show:

figure 1, a prospective view of the clutch hinge according to the invention, applied to the frame and sash of a door;

figure 2, an exploded view of the individual component elements of the hinge in figure 1;

figure 3, a detail of the pivot with bucket springs incorporated;

figure 4, a view from above of the elements of figure 2 assembled to form the hinge according to the invention;

figure 5, a prospective view of a door sash hinged to the frame with the pinzer element equipped with adjustment screw and pressure spring for braking, and with a 180^{o} arc sector on the right side;

figure 6, a view analogous to that of figure 5 with the variant of the pinzer element with one adjustment screw only and with a 90^{o} arc sector, again on the right side;

figure 7, a view analogous to that of figures 5 and 6, with the variant of the pinzer element equipped with an expansion spring only and with a 90^{o} arc sector, on the left side.

In figure 1, the clutch hinge according to the invention has been indicated generically with 1. The first

fixed element 5 is anchored to the frame 2 of the door; the second mobile element 4 has a slot 8 in which slides the pin 7 of a rod 14 fixed to the sash 3 of the door. In the case of a frame 2 of the type in figure 1, the first fixed element 5 is anchored to it with a backing element 13. The length of slot 8 must be at least equal to the distance between the pin head screw 9 and the axis 15 common to the hinges which block the sash in rotation.

Figure 2 shows all the component elements of hinge 1. Note how the first fixed element 5 has a U-shaped housing formed by the vains with the square moldings 9', only one of which is shown in the drawing, to block rotation of the pin head screw 9. The second mobile element 4 is inserted in the U-shaped housing of the first fixed element 5 with the opening 9" in correspondence with the square molding 9' of one of the vains, with corresponding identical molding in the other vain but not shown in the drawing. The pin head screw 9 is then blocked by means of nut 11 and washer 10. Note how, thanks to the presence of a square molding in each of the vains, it will be possible to use the hinge according to the invention for both left and right sashes, that is, by having the threaded part of the pin head screw 9 protrude upward so as not to interfere with the movement of the sash.

On two sides of the second mobile element 4 there are

two disks 6 made of a material capable of generating friction but the at the same time resistant to wear by rubbing, preferably in asbestos. Between each disk 6 and the respective vain of the U-shaped part of the first fixed element 5 there is a spring, preferably a bucket spring (6'), which is convex toward the outside of the vain. The degree of tightening of the pin head screw 9 with nut 10 and washer 11 regulates the pressure between the first fixed element 5 and the second mobile element 4, pressure which in virtue of the action of springs 6' and disks 6, in suitable material, as described above, to generate the elastic friction effect and so the blocking of the sash, with almost no noise.

Figure 3 shows a detail of the pivot with springs 6'.

Figure 4 shows a hinge of the type described when completely assembled.

It would of course be possible to realize the clutch without springs, just by using the asbestos disks 6, or one could one helical springs instead of bucket springs. Also the hinge could be built with consideration for the aesthetic effect and color as well.

Another embodiment of the invention is illustrated in three variants in figures 5, 6 and 7.

In figure 5 the door frame is indicated with 101, the door sash with 102. The two parts of the pinzer element, generically indicated with E, are respectively 103 and 104. The lower part 103 of the pinzer element is fixed with screws 105 to the door sash 102 and bears on one end a blind opening (not shown in the drawing) for placing one end of helical expansion spring 106 and, not far away, a threaded opening (not shown in the drawing) for holding screw 107. The upper part 104 bears on one end a blind opening (not shown in the drawing) for placing one end of expansion spring 106, in correspondence with the blind opening of the lowerpart 103, and a passing opening 108 (not shown in the drawing), for the passage of screw 107 which fits into the threaded opening of the lower part 103. On each end, placed on the same side of the two parts of the pinzer element, suitable putty is used to apply an asbestos plate 109,109' with slightly protruding edges. The pressure spring tends to lower the upper part 104 of the pinzer element toward the lower part 103. Between the two parts 103 and 104, a 180^{o} arc semi-circular sector 110 penetrates, in well polished and tempered elastic steel, with right angle bend 111 on the right of the curved parts, with application on the right side of frame 101 of the door. As shown in figure 5, this application is effected in the present case with a spacer 112 placed between, to serve to fill the empty space in the frame 101. In this particular situation, the parts of the pinzer element are realized in metal, pre-

ferably in aluminum. These could however also be realized in hard synthetic resin, in which case instead of the protruding asbestos plates 109,109', the ends of parts 103,104 would have been made in slightly protruding soft synthetic resin. However, the semicircular sector must always and only be realized in tempered and polished elastic steel. The pressure exerted by spring 106 is regulated by means of screw 107. The friction which develops between the plates 109,109' and the semicircular sector 110 is thus established directly between the sash and frame. The elasticity of the steel of which the sector is made compensates for any excessive tolerances due to assembly or to the settling of the parts. While the proportions were enlarged in the figure for greater clarity, the dimensions of the device may be sufficiently contained to satisfy aesthetic requirements, without compromising the characteristics of the block which leave the sash free of vibrations or oscillations; this characteristic is reinforced by the extension of the friction surfaces of the plates 109,109'.

Figure 6 shows a variant. The pinzer element E' still consists of a lower part 103 and an upper part 104. Again, the lower part is fixed to the sash 102 with screws 105. The upper part 104, in any case, is anchored to the lower part 103 only by means of adjusting screw 107, the pin 107' serving only to block any rotation of the part 104 during use. The friction ef-

fect on sector 111', in this case only 90° again with the angle bend on the same side because it is to be used on the right side of the frame, is thus more violent than that in figure 5, since it is less adjustable.

Figure 7 shows another variant. The pinzer element E" again consists of a lower part 103' and an upper part 104'. The lower part 103' is fixed to the sash 102 of the door by means of screw 105', and is hinged to the upper part 104' with pin 113 hit from one side and serving as fulcrum. A spring 106 is placed in sites each drawn, in opposite correspondence, in the ends of the two parts 104',103'. The effect of the friction on sector 111' - in this case as well only 90°, but with the angle bend on the side opposite that in figures 5 and 6 for application to the left side of the frame - is less violent than in the embodiments shown in figures 5 and 6, but not adjustable, since it arises only from the dimensions of spring 106.

Claims:

1. Clutch blocking device for adjusting and blocking open door or window sashes in the desired position, characterized by the fact that a clutch connection (1,7;E,110) is established between the door or window sash (3,102) and the respective frame (2,101), simultaneous with the movement of the sash and with a direct blocking effect with no manual intervention, the force of friction of said clutch being adjustable by means of elastic means (6',106).

2. Device as claimed in claim 1, characterized by the fact that said clutch connection is represented by a hinge realized in any desired material, like light alloys, synthetic resins, preferably aluminum, consisting of two elements (5,4) connected by a pivot, the first of which (5) is fixed to the frame (2) of a door or window, while the second is rotated by a pin (7) fixed by means of a rod (14) onto a sash (3) and sliding inside a slot (8) of said second element (4), where said first (5) and second (4) elements are connected to one another by means of a pivot realized like a clutch by placing between said fixed first element (5) and said second mobile element (4), on both sides of the latter, material which can generate friction and, at the same time, which has sufficient resistance to wear by rubbing, where said pivot (1) releases part of its friction force to elastic elements (6') placed in turn on

both sides of said second mobile element (4), between said material and said first fixed element (5).

3. Device as claimed in claim 2, characterized by the fact that said elastic elements (6') are bucket springs, each of which is placed between one of the vains of the U-shaped part of the fixed first element (5) and the second mobile element (4) with interposition of a respective disk of asbestos (6).

4. Device as claimed in claim 2, characterized by the fact that the length of the slot (8) in said second mobile element (4) must be at least equal to the distance between the pin head screw (9) and the axis (15) common to the hinges which hold the sash in rotation.

5. Device as claimed in the preceding claims, characterized by the fact that the second mobile element (4), with disks (6) on the sides, is articulated within the U-shaped part of the first fixed element (5) by means of a pin head screw (9) which, under the head, has a square molding (9') which becomes blocked in one of the identical moldings in each of the vains of the U-shaped part of the first fixed element (5), and that siad pin head screw (9) is tightened by means of a washer (10) and nut (11) always placed on the upper part of the sash (3).

6. Device as claimed in claim 1, characterized by the fact that said clutch connection is represented by a

pinzer element realized in metal, light alloy, or synthetic resin, preferably aluminum, said pinzer element (E,E',E") being equipped with wear-resistant means and being fixed to a door or window sash (102) to operate via friction along the entire 180° opening of said sash (102), directly on means (110,111',111") joined to the door frame (101), where these also extend along a 180° arc, that is along the section covered by the rotating sash.

7. Device as claimed in claim 6, characterized by the fact that the pinzer element (E,E',E") exerts a braking action by means of expansion spring (106) and adjustment screw (107), operating singly or in combination.

8. Device as claimed in claims 6 and 7, characterized by the fact that said means resistant to the wear due to friction consist of asbestos plates (109,109') when the parts (104,103;104',103') of the pinzer element (E,E',E") are made of metal and that the ends of the upper (104,104') and lower (103,103') parts are realized in soft synthetic resin when the remainder of the device is realized in hard synthetic resin.

9. Device as claimed in claim 6, characterized by the fact that said means joined to the frame of the door or window, consist of a plane sector (110,111',111") in metal, preferably in tempered and polished elastic steel, with a 180° arc, or a 90° arc, depending on the ampli-

tude of the sash opening.

10. Device as claimed in claim 9, characterized by the fact that the sectors (110,111',111") have a right angle bend at the base one one side or the opposite side depending on whether they are applied to the right or left end of the frame (102), and that the mid-point of the sector (110), respectively the point corresponding to the right angle of the sectors (111',111") must always be aligned with the axis passing through the hinges which constrain rotation of the sash (102).

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FIG.1

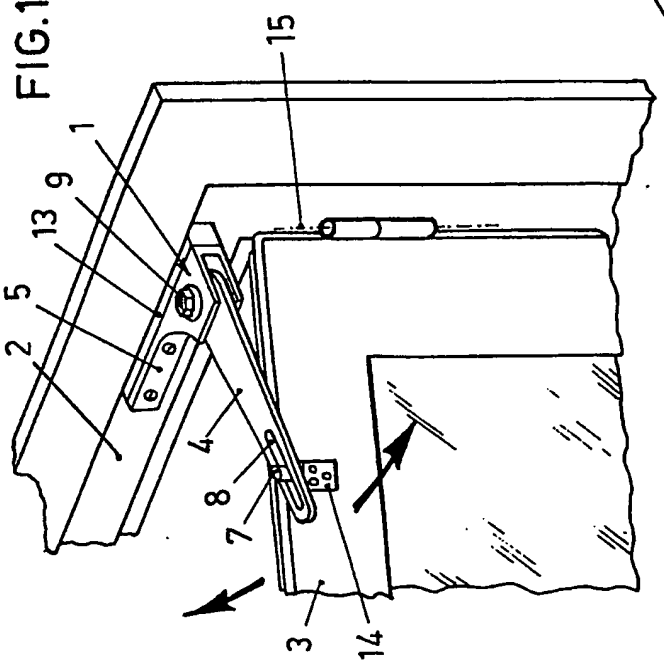


FIG.2

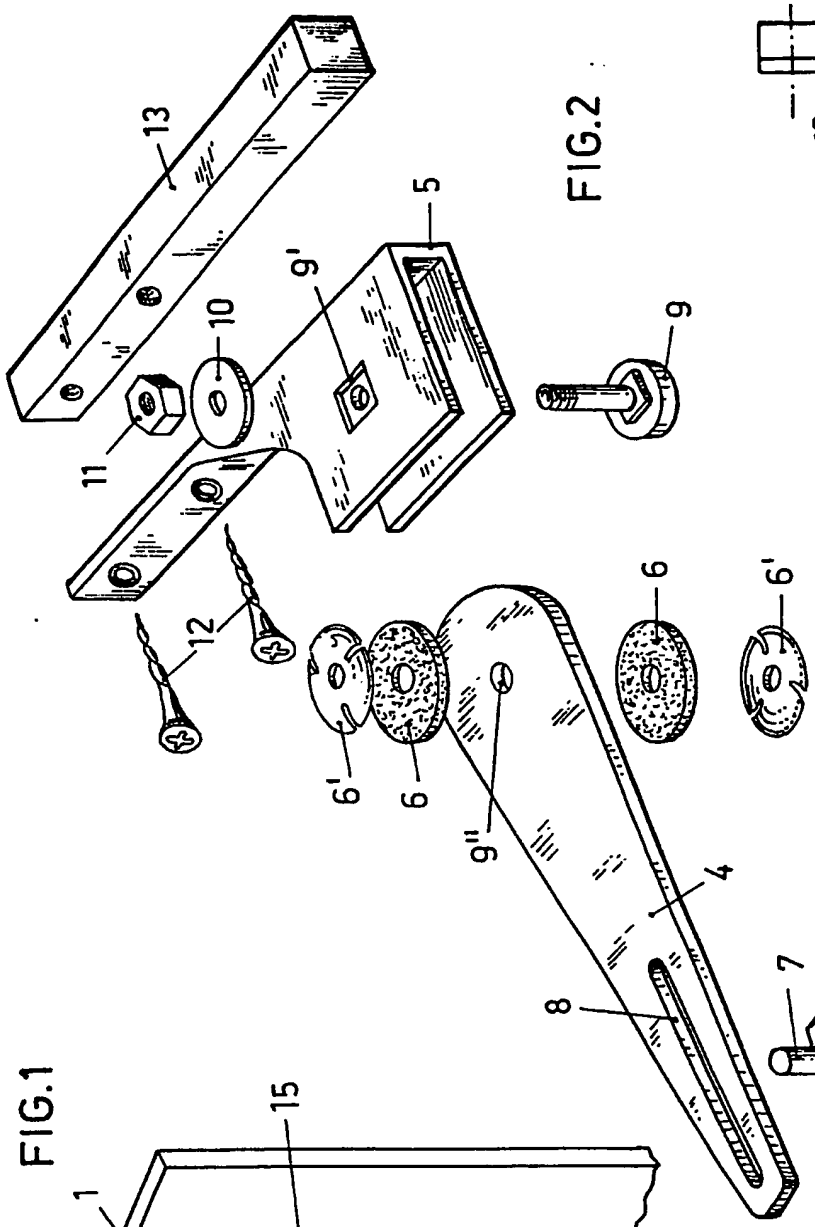


FIG.3

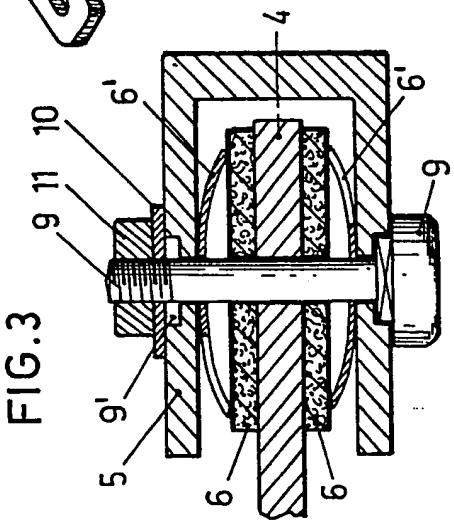
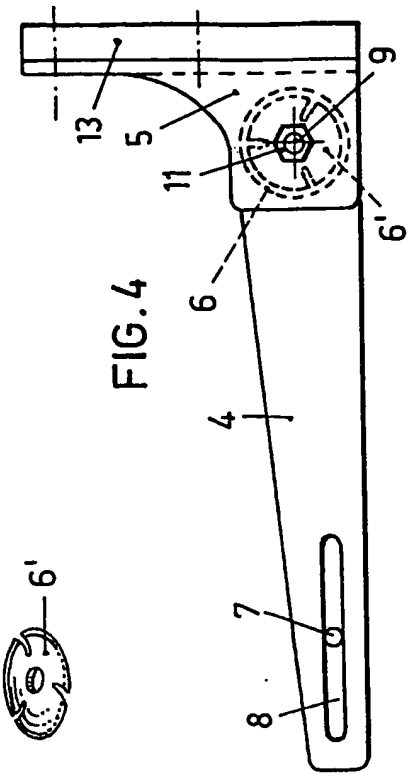


FIG.4



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FIG.5

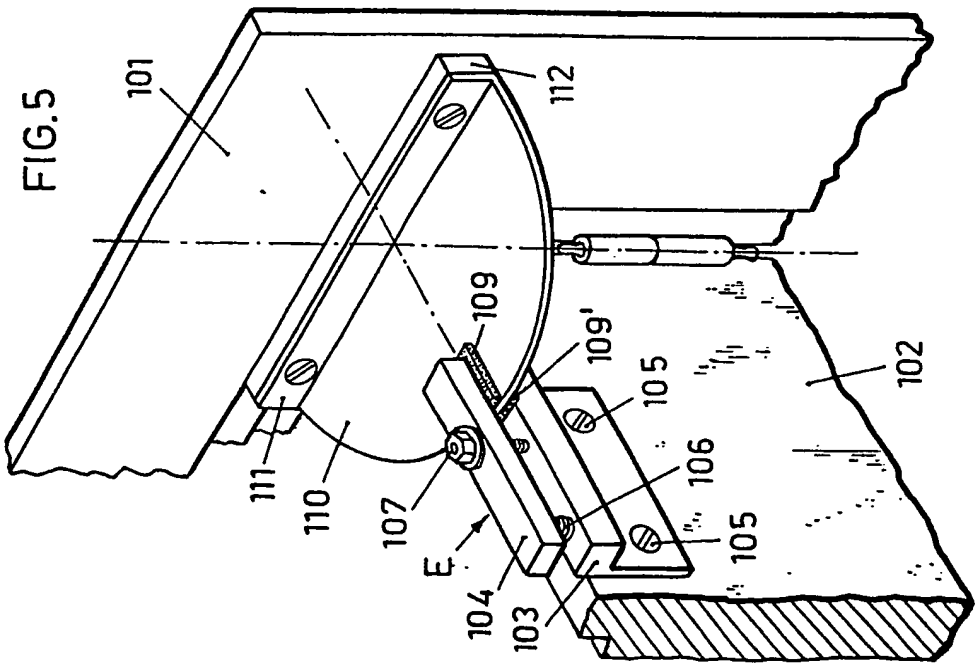


FIG.6

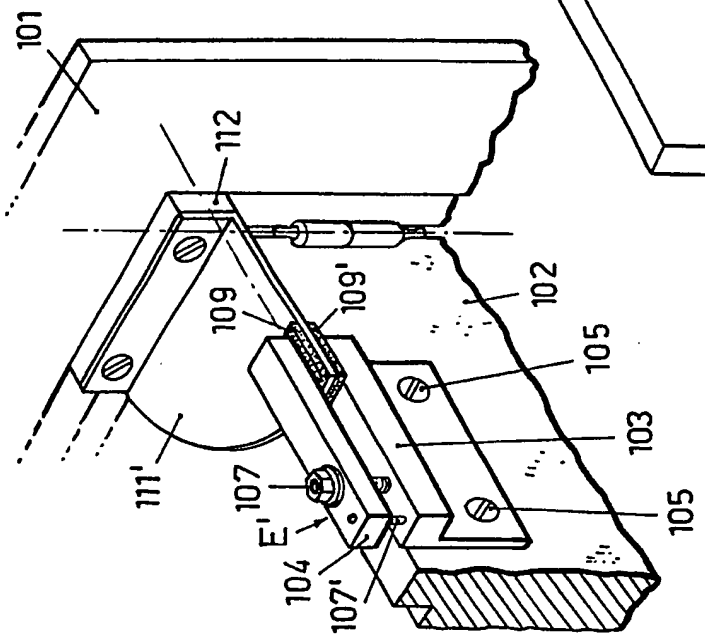


FIG.7

